

# **Open Market Share Reacquisitions, Surplus Cash, and Agency Problems**

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# **Open Market Share Repurchases, Surplus Cash, and Agency Problems**

## **ABSTRACT**

This paper investigates the role that excess cash plays in explaining actual open market share repurchases and examines the impact of agency problems on the payout decision. Using data from the U.K., where disclosure regulations make it possible to directly measure the volume and value of shares repurchased, we find that repurchase activity clusters in cash generative industries where investment opportunities are scarce. Holding investment opportunities constant at the firm level, we find that abnormally high cash flows from operating and (to a lesser extent) investing activities drive both the probability of a repurchase and the amount spent reacquiring shares. Comparing a subset of repurchases that are unambiguously driven by the desire to distribute surplus cash with a cash-matched sample of nonrepurchasing firms, we find that repurchasers are characterized by lower managerial entrenchment. Repurchasers also report superior improvements in postrepurchase operating performance and are less likely either to fail or be targeted in corporate control contests during the two-year period following the payout decision. Our results support the view that managers use share repurchases as flexible tool for distributing transitory cash surpluses, but only in the absence of serious agency problems between inside and outside shareholders.

**Keywords:** Share repurchases; operating cash flow; managerial entrenchment.


## **Open Market Share Repurchases, Surplus Cash, and Agency Problems**

Firms are increasingly turning to share repurchases as a means of distributing cash to shareholders. In the U.S., Grullon and Michaely (2000) estimate that industrial firms spent more repurchasing shares in 1999 and 2000 than they paid out in dividends. Compared with dividends, repurchases are viewed as providing greater payout flexibility, particularly in the presence of temporary cash flow surpluses (Guay and Harford (2000), Jagannathan, Stephens, and Weisbach (2000)). Firms also use repurchases to offset earnings dilution resulting from employee stock option plans (Kahle (2002), Fenn and Liang (2001)) and to exploit market mispricing (Ikenberry, Lakonishok, and Vermaelen (2000 and 1995)). Consistent with the U.S. experience, the fashion for share repurchases is increasingly evident in other jurisdictions. For example, Ikenberry et al. (2000) document a 140 percent rise in the dollar value of repurchase programs announced by Canadian firms between 1989 and 1997. Lasfer (2001) reports similar levels of growth among European companies.

In this paper, we use U.K. data to explore the association between share reacquisitions, excess cash, and firms' corporate governance arrangements. Despite growing evidence concerning the advantages of repurchases as a method of distributing transitory cash shocks, prior research on the links between corporate liquidity, agency costs, and payout decisions focuses primarily on cash holdings and (or) dividend payments (e.g., Dittmar, Mahrt-Smith, and Servaes (2003), Mikkelsen and Partch (2003), Pinkowitz, Stulz, and Williamson (2003), Harford (1999), Opler, Pinkowitz, Stulz, and Williamson (1999)). In contrast, the intervening effect of agency problems on the use of share repurchases for distributing temporary cash windfalls has been largely ignored.

We begin by examining the association between actual open market share reacquisitions and firms cash position using a comprehensive panel of repurchase data from 1995 through 2000.

We restrict our focus to open market repurchases because self-tender offers are extremely rare in the U.K. Several features make the U.K. an attractive setting in which to investigate the link between repurchases and excess cash. First, the volume and value of shares repurchased in the open market are directly observable. This contrasts with the U.S. where a lack of disclosure means that precise measures of the number and cost of open market repurchases are not available (Dittmar (2000), Jagannathan et al. (2000), Stephens and Weisbach (1998)). Second, the prevailing regulatory environment affords relatively sharp tests of the link between shares repurchases and excess cash because fewer competing motives for reacquisitions exist. For example, open market share repurchases are not driven by attempts to offset the dilutive impact of employee stock option plans in the U.K. because reacquired shares cannot be reissued to fund option exercises.<sup>1</sup> Further, Rau and Vermaelen (2002) demonstrate how regulations restrict firms' opportunities to use open market buybacks to exploit mispricing. Third, the U.K. is one of the few markets outside the U.S. where share repurchases are commonplace. For example, Lasfer (2001) finds that U.K. firms account for almost 80% of aggregate European share repurchase activity.

Consistent with the surplus cash hypothesis, we find that repurchase activity clusters in cash generative industries with poor investment opportunities. Holding investment opportunities constant at the firm level, we find that temporarily high cash flow performance  lains both the likelihood and value of repurchases. These results support Guay and Harford's (2000) and Jagannathan et al.'s (2000) conclusions that repurchases are used to distribute temporary cash surpluses in a timely manner. Similar to Ikenberry et al. (2000) and Stephens and Weisbach (1998), we also find that repurchases are associated with poor recent stock price performance.

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<sup>1</sup> U.K. firms are not permitted to use the treasury stock method of accounting for share repurchases. Companies wishing to fund their employee stock option programs from issued shares are therefore forced to set up a wholly-owned trust company to repurchase shares on behalf of the firm and then issue them to employees. The shares acquired by these trust companies do not meet the legal definition of a share repurchase and are therefore not included in our sample. Accordingly, none of the firms in our sample mention offsetting earnings dilution by stock option compensation plans among their list of repurchase reasons. In contrast, Brav, Graham, Harvey and Michaely (2003) report that 66% of U.S. managers

Consistent with the regulatory restrictions highlighted by Rau and Vermaelen (2002), however, the underpricing effect is of strictly second order importance.

Having established that U.K. firms use share reacquisitions to distribute transitory cash surpluses, we turn our attention to the question of what motivates managers to return these surpluses to shareholders in the first place. Although the presence of excess cash may be an important determinant of repurchase payouts, it is not a sufficient condition. Agency theory predicts that conflicts of interest between insiders and outsiders can result in excess cash being retained or invested unproductively, rather than being distributed via dividends or share repurchases. All else equal, therefore, agency theory predicts that the decision to pay out temporary cash surpluses by repurchasing shares will be conditional on the magnitude of the agency costs of managerial discretion.

Existing evidence on the agency costs of corporate liquidity and their impact on payout policy is mixed. Opler et al. (1999) study the determinants of cash holdings and find little evidence of an association with agency problems. Instead, they conclude that cash holdings are primarily driven by the costs of cash shortfalls and external financing. Mikkelson and Partch (2003) study U.S. firms with persistently high cash holdings and reach a similar conclusion. In contrast, Harford (1999) reports that cash-rich firms are more likely to attempt acquisitions, and that cash-rich bidders overpay in acquisitions and exhibit poorer postacquisition operating performance. Lang, Stulz and Walking (1991) also find that U.S. firms with potentially high agency costs are more likely to overpay in acquisitions, while Blanchard, Lopez-de-Silanes and Shleifer (1994) demonstrate that firms in receipt of large cash windfalls use these surpluses to fund non-value-increasing activities. More recently, a number of studies have used international data to shed further light on the issue. The findings of this body of work broadly support the agency cost explanation of cash holdings. For example, Dittmar et al. (2003) model international

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surveyed identified stock options as either an important or very important factor influencing their repurchase decision.

variation in cash holdings and conclude that firms in countries with poor shareholder protection hold more cash because minority investors are unable to force entrenched managers to disgorge surplus balances. Pinkowitz et al. (2003) also find that firms in countries with poorer investor protection hold more cash (after controlling for economic development and risk) and that consistent with an agency cost interpretation, these holdings are heavily discounted by minority shareholders in such regimes. Using both firm- and country-level tests, Kalcheva and Lins (2004) find that minority shareholders discount the value of firms with a combination of high cash holdings and expected managerial entrenchment, and that the magnitude of this discount is more pronounced in countries where minority shareholder rights are weakest.

Contrary to the predictions of agency theory, Opler et al. (1999) report that total cash payouts to shareholders are increasing in the level of excess cash. On the other hand, the sensitivity of payouts to changes in excess cash is very low, suggesting that agency considerations may impact on payout decisions. International evidence strongly supports the agency model of corporate cash distributions. La Porta et al. (2000) report that firms pay out more of their earnings in the form of dividends in countries with good legal protection for shareholders. Kalcheva and Lins (2004) find that minority shareholders place a valuation premium on dividend paying firms where expected managerial entrenchment is high and that this premium is more pronounced in countries with poor shareholder rights for minorities.

We explore the impact of agency problems on the use of share reacquisitions to distribute surplus cash by focusing on a subset of firms where the decision to reacquire shares is unambiguously driven by a desire to distribute excess cash. We match these cases with firms from the same industry with similar cash flow profiles but which elected not to distribute their excess cash (either via a share repurchase or special dividend). Comparison of the two groups provides no support for the view that repurchasers pay out cash as a result of lower growth opportunities or reduced costs of external financing. Instead, we find that repurchasers are characterized by less managerial entrenchment, as reflected in lower insider stock ownership and

stronger board monitoring. In the postrepurchase period, we find that reacquiring firms display significantly higher improvements in operating performance, face fewer disciplinary corporate control contests, and are less likely to fail. Our results point to agency problems between insider and outsider shareholders as a potentially important determinant of the decision to distribute transitory cash surpluses by repurchasing shares.

Section I summarizes the regulation of share reacquisitions in the U.K. and describes our sample selection procedure. Section II presents our empirical tests of the factors that explain reacquisition activity. Section III compares firms that elect to distribute surplus cash by reacquiring their shares with firms with similar cash flow profiles that retain their temporary cash windfalls. Section IV concludes.

## **I. Share Reacquisitions in the U.K.**

### *A. Institutional Features*

The legal and regulatory environment governing open market share repurchases in the U.K. is very different to that in the U.S. Historically, U.K. firms were prohibited from purchasing their own ordinary shares. These restrictions were eased by the Companies Act 1981 and currently repurchases are regulated by a combination of the Companies Act 1985 and the Listing Rules of the London Stock Exchange (LSE). Under these regulations, firms must obtain shareholder approval before repurchasing shares in the open market. Firms routinely seek and renew such authorisation each year at their Annual General Meeting, although such authority does not represent a binding commitment to make repurchases. Company Law restricts the number of shares that can be reacquired in the open market during a 12-month period to 15 percent of the equity outstanding at the beginning of the period, although firm-specific authorisations often impose even tighter restrictions (e.g., 5 or 10 percent). Repurchases can only be funded out of distributable profits (or the proceeds of newly issued shares) and in contrast to the U.S. where repurchased shares are held as treasury stock for subsequent reissue, reacquired

shares must be cancelled immediately in the U.K. Full details of all reacquisitions made during the fiscal year, including the total number of shares reacquired, the average price paid and aggregate cost, must be disclosed in firms' published financial statements, together with the reason(s) for the repurchase (Companies Act 1985, Schedule 7, paras. 8 and 9). These rules ensure that precise measures of repurchase activity are readily available on an annual basis.

### *B. Data*

We use mandated financial statement disclosures to identify the number and value of open market share reacquisitions made by U.K.-domiciled firms listed on the London Stock Exchange (exclusive of closed-end investment trusts). In the absence of machine-readable data on the volume and value of actual share reacquisitions, we employ a two-stage sampling procedure. First we identify an initial sample of potential repurchasers consisting of all firms with at least one share repurchase-related news event between January 1995 and December 2000. Repurchase news events are obtained from a variety of sources including the London Stock Exchange Regulatory News Service (RNS), the Securities Data Corporation (SDC), and The Financial Times.<sup>2</sup> Our sample period begins in January 1995 because this is the earliest date that news announcements are available on the RNS database. After screening the initial set to remove non-U.K.-domiciled firms, non-listed firms and closed-end investment trusts, we are left with a sample of 3,476 announcements for 456 firms. To this set we add all U.K.-domiciled firms in the Datastream alive and dead stocks files that report at least one negative value for item #1101 (Net Capital Issues) during our sample period but which are not included in our announcement sample. This procedure yields a further 32 firms, resulting in a final sample of 488 potential repurchasers.

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<sup>2</sup> We retain all firms with at least one news announcement regardless of the specific nature of the announcement. Announcements cover a spectrum of events including proposals to seek authority to repurchase shares at a forthcoming Annual or Extraordinary General Meeting; confirmation that repurchase authority has been granted at a recent General Meeting; plans to implement a specific buyback programme; plans to resume, continue with or extend an existing repurchase plan; and notification of actual share reacquisitions.



In the second step of our sampling procedure, we examine published financial statements of all firms in the potential repurchaser sample to identify the aggregate number and value of actual share reacquisitions made in each fiscal year during our sample period, together with the reason(s) for the repurchase. Our final sample consists of 429 firm-year repurchases made by 251 firms: 126 firms make reacquisitions in a single fiscal year, 85 firms make reacquisitions in two years and 40 firms make reacquisitions in three or more years. Our final sample of actual reacquirers is substantially smaller than the potential repurchaser sample because many firms that seek shareholder approval to repurchase their shares fail to exercise this authority.

Table I presents descriptive statistics for our sample. Panel A reports reacquisitions by value while Panel B reports the number of shares reacquired as a fraction of beginning-of-period shares outstanding. The aggregate value of shares reacquired during our sample window is almost £22 billion, with the average (median) deal worth £51 million (£3 million). The 12-month aggregate number of shares bought in the typical open market program is almost 5 percent of beginning-of-period shares outstanding. A striking feature of the data is the dramatic growth in reacquisition activity during the sample period. Rau and Vermaelen (2002) attribute part of this growth to changes in the way repurchases were taxed during the period.

## **II. Share Reacquisitions and Surplus Cash**

### *A. Variables*

With the exception of tests in which we model the probability of a share reacquisition, our primary measure of repurchase activity is the total value of shares reacquired in the open market in fiscal year  $t$  scaled by lagged total assets. We model the amount paid out to shareholders rather than the fraction of shares bought back because we believe that the cash magnitude of the payout is the key decision variable. However, our conclusions are not sensitive to this choice and we obtain similar results when we use the fraction of shares repurchased.

We examine the drivers of repurchases using both stock and flow measures of cash. Our stock measure is total cash and cash equivalents. Our flow measures are cash from operating activities and cash from investing activities, constructed using data from the cash flow statement. All cash variables are scaled by total assets net of cash holdings. We also use a series of control variables drawn from previous share reacquisition models estimated by Dittmar (2000) and Stephens and Weisbach (1998). These include investment opportunities (the market-to-book ratio), underpricing (an indicator variable equal to one if 12-month market-adjusted stock returns are negative and zero otherwise), leverage (total current liabilities plus long-term debt minus cash divided by total assets net of cash), dividend payments (the dividend payout ratio), and firm size (the natural log of total assets).

#### *B. Industry-Level Analysis*

We begin our analysis of the link between open market share reacquisitions and surplus cash by examining repurchase activity at the industry level. The surplus cash hypothesis predicts that share reacquisitions are used to distribute excess cash when investment opportunities are scarce. To the extent that the investment opportunity set is largely determined by the industry in which a firm operates (Smith and Watts (1992)), share reacquisitions should cluster in cash generative industries where investment opportunities are poor. The use of industry-level data provides potentially sharp tests of the relationship between reacquisitions and cash because the impact of other firm-level effects such as underpricing and leverage are likely to be diluted through the aggregation process. We explore the association between repurchases and cash in Table II by regressing the average value of share reacquisitions in industry  $k$  during calendar year  $t$  on cash holdings, cash flows, the market-to-book ratio, and a vector of control variables. Industry-years where the average market-to-book ratio falls below the cross-sectional median ratio are classified as having poor investment opportunities. The vector of control variables comprises measures of excess sector stock returns, firm size, the dividend payout ratio, and an

indicator variable capturing the abolition of Advanced Corporation Tax (ACT) in April 1999.<sup>3</sup> All variables with the exception of the ACT dummy are industry-year means computed using data for all firms on the Datastream alive and dead stocks files. The model is estimated using all Datastream level-4 industry groups with available data. The initial sample consists of 225 industry-year observations for calendar years 1995 through 2000. A number of our regression specifications also employ measures of cash flow from operating and investing activities. Because Datastream does not report these data for financial firms, the number of useable observations declines to 189 when these variables are used.<sup>4</sup>

Regression summary statistics and coefficient estimates are reported in Table II. Although the estimated coefficient on the average cash holdings term is positive in model 1 as predicted by the surplus cash hypothesis, it is not significant. Cash holdings per se do not therefore appear to be a strong predictor of share repurchases at the industry level. In model 2, we add cash flow from operations (CFO) and cash flow from investing activities (CFI). The estimated coefficients on CFI and CFO are both positive, although only the latter is significant. The CFO coefficient is also more than three-and-a-half times larger than the CFI coefficient. (A partial F-test rejects the null hypothesis that the CFO and CFI coefficients are equal at the 1 percent level.) The estimated coefficient on the cash holdings term doubles in magnitude and becomes significant at the 5 percent level. These results highlight the importance of controlling for the source of cash and suggest that both cash holdings and operating cash flows drive industry-level share reacquisition activity.

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<sup>3</sup> Prior to April 1999 the U.K. operated an imputation system of taxation. Under this system, open market share reacquisitions qualified as distributions for tax purposes and as such generated an ACT charge. In the absence of surplus ACT capacity against which to offset this charge, share reacquisitions generated an additional tax liability. Accordingly, open market reacquisitions were relatively unattractive to firms seeking to minimise their ACT liability. The abolition of ACT removed this obstacle, thereby increasing the attractiveness of repurchases as a distribution mechanism.

<sup>4</sup> As a check on the impact of excluding financial firms, we repeat the analysis using cash flow data supplied by Thomson Analytics (TA). In addition to providing cash flow data for U.K. non-financial firms, TA also reports operating and investing cash flow data for financial firms. The cash flow results using the TA data are uniformly stronger than those reported in Table II, suggesting that our conclusions are robust to

Models 3 and 4 expand the basic regression to consider the intervening effect of investment opportunities on the link between share reacquisitions and surplus cash. The main effect cash variables in these two models capture the association between reacquisitions and cash in industries where investment opportunities are plentiful, while their associated interaction terms capture the marginal impact of cash in industries with poor investment opportunities. Results for both models indicate that cash holdings are unrelated to share reacquisitions in high market-to-book industries. In contrast, the estimated coefficients on the Cash holdings  $\times$  Low MB interaction terms are positive, statistically significant at the 5 percent level, and large in magnitude. The link between share repurchases and cash holdings appears to be confined to industry-years where investment opportunities are poor. A similar pattern is evident in model 4 when operating cash flow is added to the regression: while the CFO main effect term is insignificant, the interaction with Low MB is positive, significant at the 5 percent level, and large in magnitude. Controlling for the impact of cash holdings, the incremental significance of the operating cash flow interaction term demonstrates the dynamic cash management role that repurchases play in the presence of operating cash windfalls and limited investment opportunities.

The CFI main effect term in model 4 is positive and significant at the 5 percent level, consistent with the prediction that repurchases are used to distribute excess cash flows arising from nonoperating activities. Contrary to expectations, however, there is no evidence that this effect is stronger in (or restricted to) industries where investment opportunities are less plentiful.

Our evidence that operating activities appear to be the primary source of cash used to fund share repurchases is consistent with Opler et al. (1999) who document that significant increases in excess cash tend to be driven by large swings in cash from operations. On the other hand, the fact that the average amount spent reacquiring shares appears more sensitive to CFO than CFI is inconsistent with the joint hypothesis that repurchases are primarily used to distribute

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financial firms. We chose not to present results using the TA data in Table II, however, because TA restate published numbers to comply with U.S. Generally Accepted Accounting Principles.

transitory cash flow shocks and that such shocks are more likely to stem from nonoperating activities (Jagannathan et al. (2000)). Analysis of the relative levels of CFO and CFI offers one possible explanation for our result. While operating activities are associated with net cash *inflows* on average, nonoperating activities are characterised by net cash *outflows*.<sup>5</sup> Accordingly, share reacquisition activity at the industry level is more sensitive to operating cash flows because operating activities are more likely to generate cash surpluses.

Of the control variables Table II, firm size is consistently positive and significant at the 10 percent level, indicating that the average amount spent on share reacquisitions is greater in industries populated by larger firms. The ACT indicator variable is also positive and marginally significant, supporting the prediction that the abolition of Advance Corporation Tax increased the attractiveness of share repurchases generally. Despite being statistically significant however, the estimated coefficients on both control variables are small relative to those on the cash variables, suggesting that the impact of firm size and tax is economically trivial relative to the cash effect.

Overall, the industry-level analysis reported in this section reveals that share reacquisitions in the U.K. cluster in sectors where average cash holdings and cash flows are high and investment opportunities are scarce. The results, which hold even after controlling for dividend payout rates, strongly support both the surplus cash and financial flexibility hypotheses.

### *C. Firm-Level Analysis*

To provide further evidence on the link between repurchases and surplus cash, we explore the determinants of share reacquisitions at the firm level. First we model the probability of a share reacquisition by comparing repurchasing firms with a matched sample of nonrepurchasers. Then we model the amount that reacquiring firms spend buying back their shares.

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<sup>5</sup> Mean (median) operating cash flow as a proportion of net total assets is 0.11 (0.12), compared with -0.11 (-0.10) for cash flow from investing activities.

### *C.1. Reacquirers Versus Nonreacquirers*

In this section we use a matched-pairs design to examine the association between surplus cash and share reacquisitions, whereby each reacquiring firm-year observation is twinned with a time-, industry- and size-matched nonrepurchasing firm. To the extent that firms' investment opportunities are largely determined by the conditions of the industry in which they operate, matching by industry group allows us to explore share reacquisition activity holding constant the investment opportunity set. Nonrepurchasers are classified as firms that did not reacquire shares during the five-year window centred on the repurchase year. Firms are matched at the Datastream level-6 industry level subject to the difference in total assets employed not exceeding  $\pm 25\%$ , otherwise they are matched using the level-4 classification.

Appropriate matching firms are unavailable in 27 cases, reducing the useable sample to 402 matched-pairs.<sup>6</sup> Of these, 314 (88) cases are matched with a control firm at industry level-6 (level-4). Missing financial statement data further reduces the sample to 365 matched pairs. In addition, because operating and investing cash flow data are unavailable from Datastream for financial firms, the number of matched pairs declines to 268 when these variables are used.

The surplus cash and financial flexibility hypotheses predict that share reacquisitions facilitate the timely distribution of temporary excess cash flows. Figure 1 presents time-series plots of operating and investing cash flows for the repurchaser and nonrepurchaser samples relative to the reacquisition year. The patterns presented in Figure 1 support the view that repurchases are paid out of temporary cash flows. Operating cash flows peak in the year preceding the reacquisition before reverting back to normal levels. Share reacquisitions also coincide with a spike in nonoperating cash flows. The contemporaneous link between repurchases

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<sup>6</sup> Matching nonrepurchasers are unavailable when all remaining firms in the industry either announce a repurchase intention or execute a repurchase during the five-year period centred on the repurchase year. The 27 nonmatched cases are drawn exclusively from the utilities sector. Accordingly, our results may not be generalizable to firms operating in this sector.

and nonoperating cash inflows suggests that share reacquisitions may play an important restructuring role by enabling management to disgorge disposal proceeds in a timely manner.

We use a conditional logistic model to relate the probability of an open market share reacquisition to measures of cash and a series of control variables. The conditional logistic model is the appropriate method for matched pairs data (Breslow, 1982). The method involves fitting a standard logistic regression to a constant response, where the model has no intercept and all explanatory variables are defined as the difference between each case–control matched pair. Accordingly, the dependent variable takes a value of one for each matched pair  $i = 1, \dots, n$ , while all explanatory variables are computed as the difference between the  $i$ th pairwise combination. The set of control variables includes proxies for investment opportunities, underpricing, net leverage and dividends. EPS growth is also included following evidence reported by Brav et al. (2003) that many U.S. firms cite the desire to increase earnings per share (EPS) among their list of repurchase reasons. Finally, firm size is included to control for any residual size differences not captured by our matching procedure.<sup>7</sup> All variables are measured at the beginning of the reacquisition year.

Table III presents estimates of conditional logistic models explaining the likelihood of an open market share reacquisition. The results provide further evidence of a link between repurchases and surplus cash. Model 1 indicates that repurchasers are characterised by higher cash holdings relative to similar sized nonrepurchasing firms operating in the same sector. However, the magnitude and significance of the cash holdings coefficient declines in model 2 when the regression is extended to include cash from operating and investing activities, suggesting that surplus cash flow, rather than accumulated cash holdings, drives firm-level reacquisition activity. Both operating and investing cash flows are significantly higher for reacquiring firms. The significance of the CFI term is consistent with the hypothesis that share

reacquisitions are used to distribute nonoperating cash inflows. However, the magnitude of the CFI coefficient is less than half that on the CFO term. A Wald test rejects the null hypothesis that the CFO and CFI coefficients are equal at the 1 percent level. An increase in operating cash flows from the first to the third quartile results in a 43 percent  $([0.778 - 0.546] / 0.546)$  rise in the implied probability of a repurchase. This compares with only a 12 percent increase in repurchase probability for a corresponding change in nonoperating cash flows. These findings mirror our industry-level results in that repurchase activity appears to be particularly sensitive to operating cash flow shocks.<sup>8</sup>

Models 1 and 2 in Table III also indicate statistically significant associations between the probability of a share reacquisition and several of our control variables. The positive coefficient estimate on the underpricing proxy indicates that reacquirers are more likely to experience negative market-adjusted returns over the 12-month period preceding the reacquisition year. These findings support the prediction that firms repurchase shares in response to perceived undervaluation. Reacquirers are also characterised by lower net leverage. One interpretation of this result is that firms use share reacquisitions to manage their capital structure when leverage ratios fall below target (Dittmar (2000)). An alternative possibility is that concern over the increased risk of financial distress prevents already highly levered firms from reacquiring their shares. Despite our matching procedure, reacquirers are significantly larger than their nonrepurchaser counterparts. Firms that undertake open market share reacquisitions are also associated with significantly higher earnings per share growth. However, analysis of the implied probabilities presented in Table III reveals that, with the exception of net leverage, the economic impact of these factors is small compared with the cash flow effect.

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<sup>7</sup> We do not consider the use of open market share reacquisitions as a takeover defence mechanism because, as Allen and Michaely (2002) discuss, such effects are likely to be restricted to self-tender offers in which a large fraction of shares are bought over a short period.

<sup>8</sup> In additional (untabulated) tests, we follow the approach in Table II and interact each of the cash variables with the Low MB indicator variable. None of the resulting interaction terms are significant at conventional



The results presented in this section demonstrate a strong statistical and economic link between the probability of a share reacquisition and temporary excess cash flow, holding constant the investment opportunity set. In the following section, we test whether, in addition to affecting the likelihood of a repurchase, cash flow performance also influences the amount spent reacquiring shares.

### *C.2. The Value of Share Reacquisitions*

In this section we model the aggregate annual spend on open market share reacquisitions for firms that undertook at least one repurchase during our sample period. The amount spent is an important dimension of the payout decision ignored by our matched-pairs tests. Further, to the extent that each reacquiring firm serves as its own control, this approach helps overcome the correlated omitted variable problem that can render the results of matched-pair tests potentially difficult to interpret. We start by constructing an unbalanced panel based on our sample of 251 repurchasing firms, comprising all firm-years with available data during the sample period (regardless of whether or not a repurchase occurred in a given year). The resulting panel consists of 1,333 firm-year observations with available financial statement and market data, of which 393 (32%) are repurchase years. Because Datastream does not report cash flow data for financial firms, the number of useable observations declines to 1,033 when these variables are used.

We use OLS regression to model the value of share reacquisitions. The dependent variable is equal to zero for firm-years in which no shares are acquired; otherwise it equals the aggregate cost of shares reacquired during fiscal year  $t$  scaled by lagged total assets. Because the amount spent on repurchases is lower bounded at zero, we apply a logarithmic transformation to the resulting measure to limit the risk of specification bias.<sup>9</sup> The primary explanatory variables of

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levels. The absence of any interaction effect is consistent with our matched-pairs design controlling for industry-level differences in the investment opportunity set.

<sup>9</sup> To avoid generating missing observations in years where no shares are repurchased, zero values are replaced with  $10^{-9}$ . We do not present results using a tobit specification because the amount spent on

interest are our measures of cash holdings, cash flow from operations, and cash flow from investing activities. In addition, the model also includes proxies for investment opportunities, underpricing, leverage (benchmarked against the industry median), dividend payments, and EPS growth. We also include an indicator variable proxying for the existence of distributable reserves because under U.K. company law, the maximum payout cannot exceed the value of distributable reserves. This variable takes the value of one if lagged total shareholder reserves are positive and zero otherwise. Similar to our industry-level tests in Table II, we also include an indicator variable to control for structural shifts in the level of share reacquisition activity resulting from the abolition of ACT.

Coefficient estimates and summary statistics for OLS regressions explaining the amount spent on share reacquisitions are reported in Table IV. Results for the cash variables in models 1 and 2 follow a similar pattern to those documented in Table III. In particular, while the cash holdings term is positive and significant in model 1, extending the model to include the two cash flow measures highlights surplus cash flows, rather than accumulated cash holdings, as the primary driver of the amount spent reacquiring shares. Also consistent with previous findings, the amount paid out is more sensitive to operating cash flows than to cash flows from investing activities. The null hypothesis that the operating and investing cash flow coefficients are equivalent is rejected at the 5 percent level using a partial F-test. Consistent with results reported in Table III, spending on share reacquisitions is positively related to underpricing and negatively associated with net gearing. Of the remaining controls variables, only ACT is consistently significant at the 10 percent level or better.

The final two columns in Table IV report results for single and multiple reacquirers separately. The magnitude of the repurchase spend is positively associated with operating cash flow for both groups. In contrast, the significance of cash flow from investing activities is

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repurchases is a bounded rather than a censored variable. However, untabulated results using a tobit estimation are entirely consistent with those reported in Table IV.

restricted to firms that repurchase shares in two or more years. Precisely why the association between reacquisition payouts and investing cash flows is restricted to multiple repurchasers is unclear. One possibility is that firms with large disposal proceeds are unable to confine payouts to a single reporting period because of restrictions on the fraction of shares that can be repurchased in a given year.

#### *D. Summary*

Summarizing the results presented in this section, we find strong evidence that U.K. firms use share reacquisitions to pay out temporary cash surpluses. Repurchase activity appears to cluster in cash-rich industries characterized by poor investment opportunities. At the firm level, both the probability and value of a repurchase are positively related to cash flow performance. Cash from operating activities, and to a lesser extent cash from investing activities, emerge as the primary drivers of share repurchase activity. To the extent that firms appear to use repurchases to pay out transitory cash surpluses in a timely fashion, these findings support both the surplus cash and financial flexibility hypotheses.

### **III. Agency Problems and Share Reacquisitions**

While the results reported in the previous section pinpoint abnormally high transitory cash inflows as a key determinant of share reacquisitions in the U.K., they fail to shed light on what drives firms to distribute such surpluses in the first place. In an effort to fully understand the link between share reacquisitions and surplus cash, we go one step further in this section and explore the reasons why some firms elect to distribute transitory excess cash (via a share repurchase) while others do not. In particular, we examine the link between the agency costs of managerial discretion and the payout decision by testing whether the severity of the agency problem between insiders and outsiders affects the likelihood that temporary cash flow windfalls are paid out through a repurchase. We compare the governance characteristics of repurchasing

firms to those of similar cash-flow-profile nonrepurchasing firms. If the decision to distribute surplus cash is conditional on the absence of serious agency problems between insiders and outsiders, repurchasing firms should be characterised by superior governance arrangements at the time of the reacquisition. We supplement these cross-sectional tests with evidence on the relative performance of repurchasing and nonrepurchasing firms in the postrepurchase period. We begin by examining postrepurchase operating performance. If repurchasing firms face lower agency costs of managerial discretion then, all else equal, they should be associated with superior operating performance improvements in the postrepurchase period. Next we compare relative takeover and failure rates for repurchaser and nonrepurchaser firms in the postrepurchase period. To the extent that increased stock market pressure substitutes for weak internal governance arrangements (Shivdasani (1993)), evidence that repurchasing firms face fewer agency problems should be reflected in a lower probability of disciplinary takeover pressure in the postrepurchase period. More generally, if repurchasing firms are characterized by lower agency costs of managerial discretion then they should be associated with lower failure rates in the postrepurchase period.

We explore the impact of agency problems on the decision to use open market share reacquisitions to distribute transitory cash inflows by comparing firms whose repurchases are most likely to be motivated by a desire to distribute surplus cash with similar firms that experience comparable cash flow windfalls but that elect not to distribute these funds through a repurchase (or any other method). A matched-pairs design based on surplus cash repurchasers serves to increase the power of our tests, as well as making the task of collecting governance data more manageable. (Machine-readable governance data are not available in the U.K. and as result all data must be manually extracted from firms' published financial statements.) The following section explains the procedure we use to identify the two sets of firms.

### *A. Identifying Firms with Transitory Cash Surpluses*

Schedule 7 of the Companies Act 1985 requires firms to disclose in their published annual report and accounts the reason(s) for any share reacquisitions made during the accounting period. We use these disclosures to identify surplus cash-driven repurchases. From our initial sample of 429 repurchaser firm-years, we retain all cases where management cited distributing surplus cash (including disposal proceeds) or increasing balance sheet efficiency among their list of repurchase reasons. The final sample consists of 132 firm-year observations.<sup>10</sup>

Each surplus cash repurchaser is then matched with a firm that experienced a similar spike in cash flow performance but chose not to increase payouts to shareholders. Matching is performed on the basis of industry (Datastream level-4), cash flow, and size (total assets net of cash holdings) at the beginning of the repurchase year. We use a sequential sort procedure whereby nonrepurchasers are ranked within their industry group first by cash flow performance and then by size.<sup>11</sup> Results reported in Section II highlight cash from operations as the main cash-related driver of open market share reacquisitions. We therefore use CFO (scaled by lagged total assets net of cash) as our primary cash flow measure for matching purposes. However, for observations where CFO is either  $< 0$  ( $n = 8$ ) or  $< \text{CFI}$  ( $n = 7$ ), we match on the basis of CFI (where  $\text{CFI} > 0$ ) on the assumption that surplus cash is more likely to result from nonoperating activities in such cases. We discard 7 cases where both CFO and CFI are negative. A further 8 cases are excluded because of missing data. Finally, 11 cases (all utility firms) are excluded because of the lack of nonrepurchasing firms in the same sector. Our final sample therefore consists of 106 high cash flow matched pairs.

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<sup>10</sup> In many cases, mandated disclosures provide only limited insights into the decision to reacquire shares. For example, 34 percent of our sample fail to provide any clear indication for buybacks beyond a bland statement that share reacquisitions are earnings enhancing, while a similar fraction cite increasing earnings per share (EPS) as the primary motive driving the repurchase.

<sup>11</sup> As discussed in Section II.B, Datastream does not carry operating and investing cash flow data for financial firms. Rather than remove these firms and erode our already small sample even further, we use cash flow data supplied by Thomson Analytics for the purpose of matching financial firms.

Figure 2 plots scaled operating cash flows for the repurchaser and nonrepurchaser samples over the period  $t - 2$  to  $t + 1$  (where  $t$  is the repurchase year). The results suggest that our sampling procedure has succeeded in isolating firms with high temporary cash flows. Operating cash flows peak in year  $t - 1$  for both groups. In addition, both samples display high operating cash flow performance relative to the industry norm. (Mean and median industry-adjusted scaled CFO are significantly positive for both groups at the 1 percent level.) Note, however, that average operating cash flows for the repurchaser sample still exceed those of the control sample despite our matching procedure. This is further evidence that repurchasing firms tend to be among the highest cash flow performers in their industry.

#### *B. Governance Characteristics and the Likelihood of a Share Repurchase*

We begin our exploration of the impact of agency problems on the repurchase payout decision by testing whether the governance arrangements of surplus cash repurchasers differ systematically from those of their nonrepurchasing counterparts (after controlling for other determinants of cash holdings). We use ownership structure and board monitoring (measured at the beginning of year  $t$ ) to proxy for the degree of agency problems between insiders and outsiders. Board stock ownership is the aggregate percentage of common equity held by all board members. To ensure that we fully capture managerial stock incentives, we also include a measure of stock-based compensation, defined as the ratio of directors' outstanding options and LTIP grants to total shares outstanding. Agency problems may also be a function of external ownership structure (Holderness (2003)). We therefore employ two external ownership measures: the largest external ownership blockholding and the sum of all identifiable institutional ownership stakes.

The board of directors represents the apex of the internal control mechanism for publicly traded firms (Fama and Jensen (1983)). We use several proxies to capture the degree of board monitoring. Yermack (1996) finds that larger boards are associated with weaker monitoring. Board size is measured as the number of board members. A large body of research indicates that

board monitoring is positively related to the proportion of independent directors (Hermalin and Weisbach (2003)). The fraction of independent outside directors is defined as the number of board members with no business or family ties to the firm scaled by total board size. We use two proxies to measure the level of board dominance. Founder is an indicator variable taking the value of one if the founder, co-founder, a founder-descendant is a current board member and zero otherwise. Dominant decision-maker is an indicator variable equal to one if the board contains either the founder or a combined Chairman and CEO and zero otherwise. We also use board tenure to reflect the likelihood that internal monitoring weakens as board service lengthens. Tenure is the years of board service for the median director. Finally, following Shivdasani (1993) we use the number of additional directorships in other LSE-listed firms held by the median board member as a proxy for director quality.

Table V Panel A reports summary financial data (measured at the beginning of the reacquisition year) for repurchasing and nonrepurchasing firms. Consistent with the results presented in Figure 2, repurchasers are characterized by significantly higher operating cash flows. Median investing cash flows are also higher (less negative) for the repurchaser group. In contrast, aggregate cash holdings for the two samples are equivalent. The mean dividend payout ratio for the two groups is also similar, while the median payout ratio is marginally higher for the repurchaser sample. Consistent with results reported in Section II.C, repurchasers display poorer stock market performance in the prerepurchase period.

Lower costs of cash shortfalls or external financing (as reflected in fewer growth opportunities, lower R&D expenditures, higher net working capital and larger firm size) might explain why repurchasing firms elect to distribute transitory cash surpluses (Mikkelson and Partch (2003), Dittmar et al. (2003), Opler et al. (1999)). However, results presented in Panel A provide little support for this view. The average market-to-book ratio for the repurchase sample is indistinguishable from that of the nonrepurchase sample while contrary to predictions, the ratio of R&D expenditure to total assets is significantly higher. The level of net working capital is also

similar for the two samples. However, despite our attempt to control for firm size as part of the sample selection procedure, repurchasers are nevertheless significantly larger than their nonrepurchasing counterparts. This is consistent with the claim that larger firms payout more cash because they face lower costs of raising funds externally.

Panel B reports summary statistics for our agency cost variables. Compared to repurchasers, high cash flow nonrepurchasing firms are associated with significantly lower levels of insider stock ownership. Mean (median) insider ownership for the repurchaser sample is 7.5 (0.3) percent, compared with 14.0 (4.3) percent for the nonrepurchase sample. Nonrepurchasers appear to fall in the mid-range of the insider ownership distribution where evidence reported by Morck et al. (1988) suggests that managerial entrenchment problems are likely to be most acute. Greater managerial entrenchment resulting from higher board ownership in nonrepurchasing firms is to some extent offset by significantly larger external ownership stakes. However, the overall magnitude of such stakes appears to be economically similar in both samples at around 25 percent.

Also consistent with an entrenchment story, nonrepurchasing firms are associated with smaller boards, a higher incidence of founder board membership, and a lower fraction of independent outside directors (although in the latter case the significance level is marginal). Further, at the director level there is weak evidence that the median board member in the repurchaser sample holds a higher number board seats in other LSE-listed firms. Taken together, these summary statistics suggest that repurchasers have less entrenched management teams relative to nonrepurchasing firms with similar cash flow profiles. The findings are consistent with outside shareholders facing higher agency problems insofar as they are less able to force entrenched managers to disgorge transitory cash surpluses in a timely manner.

To test whether our univariate evidence is robust to other observed differences between the repurchaser and nonrepurchaser samples, we estimate conditional logistic regressions relating the probability of a repurchase to measures of agency problems and a series of additional control



variables. To the extent that many of our agency variables are highly correlated with one another, this multivariate approach also allows us to test which specific aspects of control matter most. Coefficient estimates and summary statistics for the conditional logistic models are reported in Table VI. Models 1 and 2 include only the governance variables. The probability of a repurchase is negatively associated with the level of insider stock ownership in both models. In addition to being statistically significant, the insider ownership effect is also economically important. For example, a reduction in the level of insider ownership from the third to the first quartile increases the probability of a repurchase by 40 percent in model 1 and 37 percent in model 2. Model 1 indicates that the presence of a founder on the board also significantly reduces the probability of a repurchase. However, examination of the associated implied probabilities suggests that the economic impact of founders is small. In model 2, we replace founder with a broader measure of board dominance that takes the value of one if the board contains either the founder or a combined Chairman and CEO and zero otherwise. This variable fails to attain significance at conventional levels, suggesting that it is the specific presence of a founder (rather than a dominant board decision-maker more generally) that affects the probability that transitory cash surpluses are distributed via a repurchase. Of the remaining governance variables in models 1 and 2, none achieve significance at the 10 percent level or better. Similar results are evident in models 3 and 4 when the regression is extended to include controls for cash flows, cash holdings, firm size, dividend payout, R&D expenditure, underpricing and leverage. Contrary to model 1, however, founder status is no longer significant at the 10 percent level in model 3.

Overall, the results reported in Tables V and VI suggest that the decision to pay out transitory cash surpluses by repurchasing shares is a function of the level of managerial entrenchment. As such, these findings suggest that while share reacquisitions may provide firms with a flexible mechanism for distributing transitory excess cash, the extent to which this payout option is utilised is conditional (at least in part) on the absence of serious agency problems between inside and outside shareholders.

### *C. Postrepurchase performance*

In this section we conduct supplementary tests of the association between surplus cash-motivated share reacquisitions and agency problems by comparing the relative performance of repurchases and nonrepurchasers in the two-year period following the repurchase year. We begin by testing for evidence of abnormal operating performance improvements among repurchasing firms. Then we test whether repurchasers are less likely to fail or be the subject of a corporate control contest.

#### *C.1. Operating Performance*

If distributing transitory cash surpluses via a share reacquisition reflects lower agency costs of managerial discretion, then we should expect to observe systematic differences in operating performance between high cash flow repurchasers and comparable nonrepurchasers in the postrepurchase period. We test for evidence of postrepurchase abnormal operating performance improvements using a version of the test developed by Healy, Palepu, and Ruback (1992) and later employed by Harford (1999). Specifically, we regress the difference in postrepurchase operating performance for the  $i$ th repurchaser-nonrepurchaser matched pair on the corresponding pairwise difference in prerepurchase operating performance:

$$Operating\ performance_{i,Post} = b_0 + b_1 Operating\ performance_{i,Pre} + e_{i,Post} \quad (1)$$

The regression uses all matched pairs with data for both the pre- and postrepurchase periods. The  $b_1$  coefficient in regression (1) captures the continuation of any differential prerepurchase performance for repurchasing firms while the  $b_0$  coefficient captures any abnormal performance improvements for these firms between the prerepurchase and postrepurchase periods. A significantly positive estimate for  $b_0$  would therefore provide evidence that repurchasing firms experienced abnormal operating performance improvements in the postrepurchase period.

Regression (1) is estimated using two measures of operating performance: operating cash flow and operating profit, both scaled by total assets net of cash. The prerepurchase period is defined as year  $t - 1$ . We run separate versions of regression (1) for postrepurchase operating performance measured in years  $t + 1$  and  $t + 2$ .

Table VII presents the results of estimating regression (1). The positive estimates reported in Panel A for  $b_1$  indicate that the superior prerepurchase operating performance for repurchasing firms documented in Tables V and VI persists through year  $t + 1$ . More importantly, the  $b_0$  coefficient is also positive and significant (at the 5 percent level), indicating that repurchasing firms experience significant abnormal operating performance improvements in year  $t + 1$ . The estimated effect, which is evident for both operating cash flow and operating profit, is also economically significant at between two and three percentage points. The intercepts are also positive in Panel B where postrepurchase performance is measured in year  $t + 2$ . However, only the operating cash flow effect is significant (at the 10 percent level), indicating that abnormal profitability improvements are largely confined to year  $t + 1$ .

The evidence that firms which elect to distribute transitory cash surpluses through share repurchases are associated with short-run improvements in postrepurchase abnormal operating performance supports the view that these firms face lower agency costs of managerial discretion.

### *C.2. Corporate Control and Failure Probabilities*

To further test whether the decision to use share repurchases to distribute temporary excess cash flows is a function of agency problems, we model the probability that high transitory cash flow firms either receive a formal takeover bid or cease to exist as an independent stock exchange entity in the two-year postrepurchase period. All else equal, we expect lower agency

costs of managerial discretion among repurchasing firms to be reflected in a lower probability of disciplinary market pressure and outright failure in the period following the repurchase.<sup>12</sup>

We classify firms as being subject to disciplinary market pressure if they receive at least one formal takeover bid or merger proposal during the two-year postrepurchase period.

Announcements of corporate control events are identified through a keyword search of the Factiva news service. We then estimate a logistic regression in which the dependent variable is equal to one if the firm received a formal bid and zero otherwise. The linear predictor consists of an indicator variable that takes the value of one if the firm is a repurchaser and zero otherwise, plus a vector of control variables drawn from the prior acquisition literature. Control variables include firm size, market-to-book, leverage, abnormal stock returns, board stock ownership, the presence of a founder on the board, the fraction of board members who are independent of management, and the presence of a significant external blockholder (defined as  $\geq$  ten percent of shares outstanding).

Firms are classified as having failed if they are no longer contained in the Datastream list of active stocks at the end of the two-year postrepurchase period. Failure to survive as an independent listed entity can occur for a variety of reasons including suspension of shares, takeover or merger, management buyout, and liquidation. Similar to the approach used to model the probability of a takeover bid, we estimate a logistic regression in which the dependent variable equals one if the firm failed during the postrepurchase period and zero otherwise. The set of explanatory variables is the same as that used in the takeover model.

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<sup>12</sup> If firms use repurchases as a means of defending themselves against possible takeover threats (Dittmar (2000)), then we would expect to observe a lower frequency of postrepurchase corporate control contests among the repurchase sample by construction (rather than because of lower agency costs of managerial discretion). As argued by Allen and Michaely (2002), however, the takeover defence role of share repurchases is likely to be restricted to self-tender offers. Consistent with this view, none of our sample firms cite takeover-related motives among their list of repurchase reasons. Note also that if open market repurchases are used as a defence mechanism, this should bias against our second prediction that repurchasing firms will be more likely to survive to the end of the postrepurchase period as an independent exchange-listed entity.

Results reported in Table VIII provide support for the prediction that repurchasing firms face fewer agency problems than their nonrepurchaser counterparts. In the takeover model presented in column 2, the repurchaser indicator variable is negative and significant (at the 6 percent level). Firms that distribute temporary cash surpluses by repurchasing shares are significantly less likely than comparable nonrepurchasing firms to become takeover targets in the two-year postrepurchase period. Consistent with prior research, larger firms and those with high board stock ownership are also less likely to be targeted in a takeover bid. The estimated coefficient on the repurchaser indicator variable is also negative and significant (at the 2 percent level) in the failure model presented in column 3. Compared with similar cash-flow-profile firms that elect not to distribute, repurchasers are less likely to fail in the postrepurchase period. Small firms, highly geared firms, and firms with low levels of board stock ownership are also significantly more likely to fail.

In addition to being statistically significant, the magnitude of the association between the repurchase decision and the subsequent probability of takeover and failure is economically meaningful. The implied probability of a takeover bid is 41% lower for repurchasing firms, while the probability of outright failure declines by 56% for firms that use share reacquisitions to distribute their transitory cash surpluses (holding all remaining explanatory variables constant at their mean values).

#### *D. Summary*

Overall, the tests presented in this section provide consistent support for the prediction that the decision to distribute temporary excess cash flow via a share repurchase is conditional on the magnitude of agency problems between insiders and outsiders. Repurchasing firms that unambiguously use share reacquisitions to disgorge surplus cash have less entrenched management teams (at the time of the repurchase), display superior improvements in

postrepurchase operating performance, and are less likely to either fail or be targeted in a corporate control contest during the two-year period following the payout decision.

#### **IV. Conclusions**

While considerable attention has been paid in the finance literature to modelling the direct association between share reacquisitions and surplus cash, surprising little consideration has been given to the factors that motivate firms with excess cash to pay it out. In this paper, we examine the extent to which firms use share reacquisitions as a means of distributing temporary cash flow windfalls and test whether agency problems between managers and external shareholders affect the payout decision. Our analysis focuses on actual share reacquisitions made by U.K. firms and exploits features of the regulatory environment that require firms to disclose both the precise number and value of shares repurchased, as well as the reason(s) underlying the repurchase decision.

We begin by examining the determinants of share reacquisitions using a comprehensive panel of repurchases made between 1995 and 2000. We find that corporate liquidity, and in particular operating cash flow performance, is the dominant factor driving repurchase activity. Other factors such as underpricing and gearing, while statistically significant, are economically less important. At the industry level, share repurchases cluster in industries with high operating cash flows and poor investment opportunities. Holding investment opportunities constant at the firm level, we find that both the probability and value of a repurchase are strongly associated with operating (and to a lesser extent investing) cash flows. Controlling for cash flow performance, the level of cash holdings does not appear to impact on the repurchase decision. Our evidence strongly supports both the surplus cash and financial flexibility explanations for why firms repurchase their shares.

The presence of temporary cash windfalls is not automatically expected to trigger a repurchase however. Anecdotal evidence suggests that the corporate landscape is littered with

cases where management have elected to either retain such surpluses or use them to fund value-destroying expansion and diversification strategies. We therefore proceed by asking the question: what factors distinguish firms that disgorge transitory cash windfalls (through a share repurchase) from comparable firms that do not? One possibility is that repurchasing firms face lower agency costs of managerial discretion. We explore this issue by isolating a subset of repurchasing firms where the payout decision is clearly driven by a desire to distribute surplus cash. We then compare these firms to a set of nonrepurchasing firms with similar cash flow profiles. Neither growth opportunities nor the costs of external financing can explain the difference in payout strategy for these two groups. Instead, we find that governance characteristics discriminate between firms that choose to payout transitory cash surpluses and those that do not. In particular, repurchasing firms are associated with significantly lower levels of board stock ownership. Our findings suggest that in the presence of transitory cash surpluses, the decision whether or not to distribute these funds by reacquiring shares is a function of the agency costs of managerial entrenchment. As further evidence of the impact of agency problems, we find that repurchasers display significantly higher improvements in postrepurchase operating performance, and are less likely to fail or be targeted in a corporate control contest during the two-year period following the payout decision. Our results support the view that while repurchases represent a flexible tool for distributing transitory cash surpluses, agency problems between inside and outside shareholders can severely hinder their use for this purpose.

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**Table I**  
**Summary Statistics for Share Repurchase Sample**

This table presents descriptive statistics for open market share repurchases made by U.K.-domiciled firms between January 1995 and December 2000. The sample is drawn from all firms with at least one repurchase announcement reported by either the London Stock Exchange Regulatory News Service, the Securities Data Corporation, or The Financial Times during the sample period, plus all remaining firms in the Datastream alive and dead stocks files with at least one negative value for item #1101 (Net Capital Issues) during the same period. Published financial statements for each firm in the potential repurchaser sample are then examined to identify the aggregate number and cost of share repurchases made in each fiscal year during our sample period. The final sample consists of 429 firm-year observations. Panel A reports the cost of shares repurchased during fiscal year  $t$ . Panel B reports the number of ordinary shares repurchased during fiscal year  $t$  as a fraction of total ordinary shares outstanding at the beginning of year  $t$ .

| Panel A: Value of shares repurchased (£ million) |     |        |         |        |        |        |           |
|--|-----|--------|---------|--------|--------|--------|-----------|
| Year   | N   | Mean   | St. dev | Q3     | Median | Q1     | Sum       |
| 1995   | 26  | 40.319 | 103.407 | 35.300 | 1.254  | 0.275  | 1048.300  |
| 1996   | 42  | 63.446 | 156.308 | 21.235 | 2.238  | 0.227  | 2664.730  |
| 1997   | 49  | 53.646 | 116.070 | 25.400 | 3.068  | 0.441  | 2628.650  |
| 1998   | 87  | 35.219 | 108.705 | 11.701 | 2.000  | 0.648  | 3064.090  |
| 1999   | 105 | 43.648 | 144.412 | 15.300 | 2.600  | 0.704  | 4583.080  |
| 2000   | 120 | 65.321 | 205.770 | 30.908 | 3.951  | 1.1695 | 7838.540  |
| All  | 429 | 50.880 | 154.385 | 21.000 | 2.675  | 0.648  | 21827.386 |

| Panel B: Fraction of outstanding shares repurchased |     |       |       |       |       |       |
|---|-----|-------|-------|-------|-------|-------|
| 1995  | 26  | 0.045 | 0.041 | 0.079 | 0.032 | 0.011 |
| 1996  | 42  | 0.052 | 0.042 | 0.079 | 0.048 | 0.017 |
| 1997  | 49  | 0.046 | 0.058 | 0.055 | 0.028 | 0.010 |
| 1998  | 87  | 0.038 | 0.036 | 0.050 | 0.025 | 0.013 |
| 1999  | 105 | 0.047 | 0.053 | 0.060 | 0.029 | 0.014 |
| 2000  | 120 | 0.057 | 0.062 | 0.077 | 0.040 | 0.014 |
| All   | 429 | 0.048 | 0.052 | 0.064 | 0.031 | 0.013 |

**Table II**  
**Industry-Level Share Reacquisition Activity**

This table presents summary statistics for OLS regressions explaining the average amount spent on share reacquisitions by firms in industry  $k$  during calendar year  $t$ . The regressions are estimated using all Datastream level-4 industry groups with available data. Industry-year averages are computed using all available firms on the Datastream alive and dead stocks files. Cash holdings, operating cash flow, and cash flow from investing activities are scaled by total assets net of cash. The cash variables are interacted with the Low MB indicator variable, which equals 1 for industry-years where the average market-to-book ratio falls below the pooled cross-sectional median market to book ratio and 0 otherwise. The market-to-book ratio equals the market value of equity plus the book values of preference dividends and long-term debt divided by net total assets. The Low MB dummy indicates industries with poor investment opportunities. Underpricing is an indicator variable equal to 1 if average 12-month share returns for the firms in industry  $k <$  the market return and 0 otherwise. Size is the natural logarithm of average total assets. Dividend payout is the average industry payout ratio. ACT is equal to 1 for calendar years 1999 and 2000 and 0 otherwise. All variables other than ACT are measured at the beginning of the reacquisition year. Reported coefficients equal estimated coefficients multiplied by  $10^2$ . Two-tailed probability values calculated using robust standard errors are reported in parentheses.

|  | Model 1           | Model 2            | Model 3           | Model 4            |
|--|-------------------|--------------------|-------------------|--------------------|
| Intercept                                      | -5.800<br>(0.129) | -15.890<br>(0.030) | -5.610<br>(0.119) | -7.980<br>(0.026)  |
| Low MB   | 1.130<br>(0.113)  | 1.560<br>(0.069)   | -2.670<br>(0.070) | -11.310<br>(0.001) |
| Cash holdings                                  | 10.340<br>(0.130) | 26.060<br>(0.026)  | -0.731<br>(0.811) | 1.500<br>(0.759)   |
| Cash from operations                           |                   | 29.320<br>(0.031)  |                   | 0.847<br>(0.859)   |
| Cash from investing activities                 |                   | 8.870<br>(0.135)   |                   | 11.600<br>(0.008)  |
| Low MB $\times$ Cash holdings                  |                   |                    | 33.190<br>(0.045) | 46.470<br>(0.010)  |
| Low MB $\times$ Cash from operations           |                   |                    |                   | 59.280<br>(0.008)  |
| Low MB $\times$ Cash from investing activities |                   |                    |                   | -7.580<br>(0.295)  |
| Underpricing                                   | 0.001<br>(0.550)  | 0.003<br>(0.862)   | 0.000<br>(0.375)  | 0.005<br>(0.750)   |
| Size   | 0.474<br>(0.070)  | 1.000<br>(0.020)   | 0.596<br>(0.048)  | 0.899<br>(0.003)   |
| Dividend payout                                | -0.121<br>(0.011) | -0.007<br>(0.913)  | -0.080<br>(0.129) | 0.151<br>(0.493)   |
| ACT  | 1.080<br>(0.129)  | 1.310<br>(0.095)   | 1.190<br>(0.098)  | 1.350<br>(0.050)   |
| Adj-R <sup>2</sup>                             | 0.0353            | 0.217              | 0.0707            | 0.3508             |
| F  | 2.37              | 7.51               | 3.44              | 10.23              |
| N  | 225               | 189                | 225               | 189                |

**Table III**  
**The Probability of a Share Reacquisition**

This table presents coefficient estimates and model descriptive statistics for conditional logistic regressions relating the probability of a share reacquisition to measures of cash and a vector of control variables. Repurchasing firms are matched with a similar nonrepurchasing firm on the basis of year, industry and size. The dependent variable takes the value of one for each matched pair  $i = 1 \dots n$  while all explanatory variables are defined as the difference between the  $i$ th matched pair. Cash holdings, operating cash flow, and cash flow from investing activities are scaled by total assets net of cash. Low MB is a dummy variable equal 1 for if the market to book ratio < the industry-year median value and 0 otherwise. The market to book ratio equals the market value of equity plus the book values of preference dividends and long-term debt divided by net total assets. Underpricing is an indicator variable equal to 1 if the 12-month market-adjusted share return < 0 and 0 otherwise. Net leverage is total current liabilities plus long-term debt minus cash divided by total assets net of cash. Dividend payout is the ratio of dividends per share to earnings per share. EPS growth is the change in earnings per share scaled by lagged earnings per share. Size is the natural logarithm of total assets. All variables are measured at the beginning of the repurchase year. Two-tailed probability values are reported in parentheses. Predicted probabilities are the implied probability of a repurchase computed at the first and third quartiles of the chosen variable's distribution (with all remaining variables in the model set equal to their sample means).

| Variable  | Model 1           | Model 2           |
|---|-------------------|-------------------|
| Cash holdings   | 0.743<br>(0.051)  | 0.282<br>(0.472)  |
| Cash from operations  |                   | 7.149<br>(0.001)  |
| Cash from investing activities  |                   | 3.040<br>(0.003)  |
| Low MB  | 0.201<br>(0.211)  | 0.534<br>(0.021)  |
| Underpricing  | 0.463<br>(0.008)  | 0.481<br>(0.051)  |
| Net leverage  | -0.407<br>(0.025) | -0.502<br>(0.045) |
| Dividend payout ratio   | 0.038<br>(0.024)  | 0.051<br>(0.066)  |
| EPS growth  | -0.050<br>(0.233) | -0.038<br>(0.397) |
| Size  | 0.696<br>(0.011)  | 1.840<br>(0.004)  |
| $\chi^2$  | 35.954            | 93.651            |
| p-value   | 0.001             | 0.001             |
| N   | 365               | 268               |
| Predicted probability of making a repurchase for top and bottom quartiles |                   |                   |
| Cash holdings   |                   |                   |
| Top quartile  | 0.572             | 0.690             |
| Bottom quartile   | 0.541             | 0.680             |
| Cash from operations  |                   |                   |
| Top quartile  |                   | 0.778             |
| Bottom quartile   |                   | 0.546             |

**Table III continued**

|                                |       |       |
|--------------------------------|-------|-------|
| Cash from investing activities |       |       |
| Top quartile                   |       | 0.719 |
| Bottom quartile                |       | 0.642 |
| Low M/B                        |       |       |
| Top quartile                   | 0.606 | 0.787 |
| Bottom quartile                | 0.533 | 0.624 |
| Underpricing                   |       |       |
| Top quartile                   | 0.549 | 0.677 |
| Bottom quartile                | 0.549 | 0.677 |
| Net leverage                   |       |       |
| Top quartile                   | 0.545 | 0.671 |
| Bottom quartile                | 0.643 | 0.771 |
| Dividend payout                |       |       |
| Top quartile                   | 0.551 | 0.681 |
| Bottom quartile                | 0.557 | 0.685 |
| EPS growth                     |       |       |
| Top quartile                   | 0.555 | 0.682 |
| Bottom quartile                | 0.542 | 0.666 |
| Size                           |       |       |
| Top quartile                   | 0.562 | 0.695 |
| Bottom quartile                | 0.534 | 0.627 |

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**Table IV**  
**Spending on Share Reacquisitions**

This table presents coefficient estimates and model descriptive statistics for OLS regressions of that amount spent reacquiring. The sample comprises all firms-years for the 251 firms that made at least one share reacquisition during the sample period. The dependent variable is the natural logarithm of the amount spent on reacquiring shares in fiscal year  $t$ . The amount spent is equal to  $10^{-9}$  for firm-years in which no shares are acquired; otherwise it equals the aggregate cost of shares reacquired during fiscal year  $t$  scaled by lagged total assets. The cash, Low MB, underpricing, net leverage and dividend payout variables are defined in Table III. EPS growth is the change in earnings per share scaled by lagged earnings per share. Distributable reserves is an indicator variable equal to 1 if total shareholders' equity and reserves is negative and 0 otherwise. All variables are measured over the fiscal year prior to the reacquisition year. The final two columns partition the sample according to the frequency of repurchases. The column headed "Single" reports results for firms that repurchase shares in only one year during the sample period. The column headed "Multiple" reports results for firms that repurchase shares in two or more years during the sample period. Two-tailed probability values are reported in parentheses.

|                                | Model 1            | Model 2            | Frequency of repurchases |                    |
|--------------------------------|--------------------|--------------------|--------------------------|--------------------|
|                                |                    |                    | Single                   | Multiple           |
|                                | Model 3            | Model 4            |                          |                    |
| Intercept                      | -29.772<br>(0.001) | -31.493<br>(0.001) | -36.446<br>(0.001)       | -27.159<br>(0.001) |
| Cash holdings                  | 2.385<br>(0.014)   | 0.971<br>(0.382)   | 0.724<br>(0.510)         | 0.916<br>(0.714)   |
| Cash from operations           |                    | 11.005<br>(0.001)  | 9.275<br>(0.022)         | 12.308<br>(0.016)  |
| Cash from investing activities |                    | 4.027<br>(0.091)   | 1.099<br>(0.656)         | 8.042<br>(0.079)   |
| Low MB                         | 0.853<br>(0.240)   | 1.676<br>(0.053)   | 1.725<br>(0.092)         | 2.349<br>(0.082)   |
| Underpricing                   | 3.029<br>(0.001)   | 3.472<br>(0.001)   | 2.583<br>(0.008)         | 4.194<br>(0.001)   |
| Net leverage                   | 1.565<br>(0.034)   | 2.025<br>(0.016)   | 1.797<br>(0.069)         | 2.190<br>(0.102)   |
| Dividend payout ratio          | -0.114<br>(0.427)  | -0.066<br>(0.651)  | -0.064<br>(0.612)        | 0.978<br>(0.238)   |
| EPS growth                     | -2.627<br>(0.049)  | -1.737<br>(0.218)  | 2.155<br>(0.218)         | -5.492<br>(0.010)  |
| Distributable reserves         | 0.818<br>(0.608)   | 0.067<br>(0.968)   | 2.801<br>(0.166)         | -2.516<br>(0.315)  |
| ACT                            | 6.857<br>(0.001)   | 6.274<br>(0.001)   | 5.175<br>(0.001)         | 7.387<br>(0.001)   |
| F                              | 14.93              | 10.78              | 5.66                     | 6.85               |
| Adj-R <sup>2</sup>             | 0.0772             | 0.0866             | 0.0806                   | 0.1047             |
| N                              | 1333               | 1033               | 532                      | 501                |

**Table V**  
**Summary Statistics for Firms with Cash Flow Windfalls**

This table presents descriptive statistics for firms citing the desire to distribute excess cash among the list of reasons for a share reacquisition. The surplus cash sample is drawn from the initial set of 429 firm-year repurchase observations from January 1995 through December 2000. Each surplus cash repurchase observation is matched with a similar nonrepurchasing firm on the basis of industry, cash flow and size (total assets net of cash). The cash, market-to-book, underpricing, net leverage and dividend payout variables are defined in Table III. R&D is the ratio of research and development to total assets. Board size is the total number board members. Fraction of independent outsiders is the ratio of board members with no business or family ties to the firm or to total board size. Founder is an indicator variable taking the value of 1 if the founder, co-founder or a descendant of the founder is a board member and 0 otherwise. Dominant decision maker is an indicator variable taking the value of 1 if the board contains the founder or a combined Chairman and CEO, and 0 otherwise. Tenure is the years of board service for the median director. Number board seats is the number of additional directorships in other LSE-listed firms held by the median board member. Board stock ownership is the ratio of directors' beneficial shareholdings to total shares outstanding. Stock-based compensation is the ratio of directors' outstanding options and other stock-based compensation grants to total shares outstanding. Largest external holding is the largest non-insider ownership stake. Aggregate institutional ownership is the sum of all identifiable institutional ownership stakes. Two-tailed probability values are based on paired t- (Wilcoxon signed-rank) tests of the difference in mean (median) values between the repurchaser and nonrepurchaser samples.

|                                     | N   | Repurchasers |       |        | Nonrepurchasers |       |        | p-value for difference |          |
|-------------------------------------|-----|--------------|-------|--------|-----------------|-------|--------|------------------------|----------|
|                                     |     | Mean         | Std   | Median | Mean            | Std   | Median | (Mean)                 | (Median) |
| Panel A: Financial variables        |     |              |       |        |                 |       |        |                        |          |
| Cash flow from operations           | 106 | 0.151        | 0.126 | 0.134  | 0.130           | 0.100 | 0.134  | 0.044                  | 0.050    |
| Cash flow from investing activities | 106 | -0.032       | 0.134 | -0.056 | -0.052          | 0.261 | -0.063 | 0.366                  | 0.027    |
| Cash holdings                       | 106 | 0.252        | 0.744 | 0.073  | 0.142           | 0.187 | 0.092  | 0.686                  | 0.237    |
| Dividend payout ratio               | 106 | 0.610        | 1.080 | 0.466  | 0.701           | 2.597 | 0.403  | 0.742                  | 0.079    |
| Underpricing                        | 106 | -0.124       | 0.304 | -0.126 | 0.086           | 0.800 | -0.015 | 0.011                  | 0.013    |
| Market-to-book ratio                | 106 | 2.127        | 1.695 | 1.502  | 2.231           | 3.344 | 1.468  | 0.751                  | 0.540    |
| R&D                                 | 106 | 0.011        | 0.033 | 0.000  | 0.007           | 0.023 | 0.000  | 0.059                  | 0.001    |
| Leverage                            | 106 | 0.359        | 0.307 | 0.387  | 0.415           | 0.256 | 0.441  | 0.067                  | 0.093    |
| Net working capital                 | 106 | 0.008        | 0.185 | -0.003 | 0.023           | 0.164 | -0.009 | 0.463                  | 0.461    |
| Firm size                           | 106 | 13.446       | 2.303 | 13.286 | 12.720          | 2.481 | 12.594 | 0.001                  | 0.001    |
| Panel B: Governance variables       |     |              |       |        |                 |       |        |                        |          |
| Board size                          | 106 | 9.358        | 3.046 | 9.500  | 8.538           | 4.036 | 7.000  | 0.031                  | 0.004    |
| Fraction of independent outsiders   | 106 | 0.252        | 0.127 | 0.250  | 0.217           | 0.159 | 0.222  | 0.092                  | 0.122    |

**Table V continued**

|   |     |        |       |       |        |       |       |       |       |
|---|-----|--------|-------|-------|--------|-------|-------|-------|-------|
| Fraction of affiliated outsiders              | 106 | 0.217  | 0.133 | 0.200 | 0.254  | 0.174 | 0.231 | 0.093 | 0.154 |
| Board stock ownership                         | 106 | 0.075  | 0.145 | 0.003 | 0.140  | 0.191 | 0.043 | 0.001 | 0.001 |
| Fraction of stock-based compensation          | 106 | 0.009  | 0.016 | 0.004 | 0.009  | 0.011 | 0.004 | 0.810 | 0.366 |
| Largest external holding                      | 106 | 0.270  | 0.202 | 0.245 | 0.293  | 0.186 | 0.269 | 0.006 | 0.029 |
| Aggregate ownership by institutions           | 106 | 0.099  | 0.063 | 0.098 | 0.130  | 0.103 | 0.118 | 0.308 | 0.276 |
| Tenure of median director (years)             | 106 | 5.448  | 3.158 | 5.000 | 5.854  | 4.580 | 5.000 | 0.458 | 0.606 |
| Number of board seats held by median director | 106 | 0.307  | 0.496 | 0.000 | 0.203  | 0.497 | 0.000 | 0.103 | 0.048 |
| Founder is a board member (%)                 | 106 | 17.920 |       |       | 28.300 |       |       | 0.073 |       |

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**Table VI****The Probability of Using a Share Repurchase to Distribute Temporary Surplus Cash**

This table presents coefficient estimates and model descriptive statistics for conditional logistic regressions relating the probability of an open market share repurchase to measures of governance quality and a vector of control variables. Each surplus cash repurchase observation is matched with a similar nonrepurchasing firm on the basis of industry, cash flow and size (total assets net of cash). The number of matched pairs is 106. The dependent variable takes the value of one for each matched pair  $I = 1, \dots, n$ . All explanatory variables are defined as the difference between the  $i$ th matched pair. Definitions of the financial (governance) variables are reported in Table III (Table V). All variables are measured at the beginning of the repurchase year. Two-tailed probability values are reported in parentheses.

| Variable                                      | Model 1           | Model 2           | Model 3           | Model 4           |
|---|-------------------|-------------------|-------------------|-------------------|
| Board size                                    | 0.064<br>(0.275)  | 0.062<br>(0.283)  | -0.152<br>(0.115) | -0.185<br>(0.061) |
| Fraction of independent outsiders             | -0.086<br>(0.950) | 0.253<br>(0.845)  | -2.273<br>(0.268) | -1.325<br>(0.502) |
| Founder                                       | -1.252<br>(0.014) |                   | -1.016<br>(0.147) |                   |
| Dominant decision maker                       |                   | 0.027<br>(0.943)  |                   | 0.492<br>(0.389)  |
| Tenure of median director                     | 0.033<br>(0.134)  | 0.015<br>(0.452)  | 0.037<br>(0.200)  | 0.022<br>(0.426)  |
| Number of board seats held by median director | 0.181<br>(0.607)  | 0.213<br>(0.531)  | 0.022<br>(0.963)  | 0.002<br>(0.997)  |
| Board stock ownership                         | -5.515<br>(0.001) | -4.617<br>(0.003) | -5.167<br>(0.018) | -3.940<br>(0.040) |
| Stock-based compensation                      | 9.390<br>(0.442)  | 6.473<br>(0.583)  | 2.495<br>(0.922)  | 0.797<br>(0.974)  |
| Largest external holding                      | -4.665<br>(0.151) | -3.463<br>(0.280) | -1.176<br>(0.773) | -0.522<br>(0.901) |
| Aggregate institutional ownership             | -0.578<br>(0.686) | 0.063<br>(0.965)  | 0.695<br>(0.700)  | 2.333<br>(0.217)  |
| Cash from operations                          |                   |                   | 10.573<br>(0.077) | 11.104<br>(0.053) |
| Cash from investing activities                |                   |                   | 2.510<br>(0.176)  | 2.520<br>(0.148)  |
| Cash holdings                                 |                   |                   | 1.752<br>(0.304)  | 1.716<br>(0.324)  |
| Firm size                                     |                   |                   | 0.882<br>(0.010)  | 1.002<br>(0.004)  |
| Dividend payout ratio                         |                   |                   | -0.104<br>(0.344) | -0.109<br>(0.328) |
| R&D   |                   |                   | 70.215<br>(0.048) | 66.983<br>(0.046) |
| Underpricing                                  |                   |                   | -1.810<br>(0.043) | -1.462<br>(0.099) |
| Leverage                                      |                   |                   | -1.645            | -1.790            |

**Table VI continued**

|   |       |        |         |         |
|---|-------|--------|---------|---------|
|   |       |        | (0.241) | (0.210) |
| Chi2  | 30.97 | 24.265 | 63.981  | 62.482  |
| p-value   | 0.001 | 0.004  | 0.001   | 0.001   |
| Predicted probability of making a repurchase for top and bottom quartiles of selected variables |       |        |         |         |
| Board size  |       |        |         |         |
| Top quartile  | 0.706 | 0.663  | 0.872   | 0.844   |
| Bottom quartile   | 0.649 | 0.605  | 0.926   | 0.919   |
| Founder   |       |        |         |         |
| Top quartile  | 0.647 |        | 0.860   |         |
| Bottom quartile   | 0.647 |        | 0.860   |         |
| Insider stock ownership   |       |        |         |         |
| Top quartile  | 0.555 | 0.528  | 0.855   | 0.849   |
| Bottom quartile   | 0.775 | 0.723  | 0.938   | 0.920   |
| Cash from operations  |       |        |         |         |
| Top quartile  |       |        | 0.915   | 0.902   |
| Bottom quartile   |       |        | 0.868   | 0.847   |
| Cash from investing activities  |       |        |         |         |
| Top quartile  |       |        | 0.919   | 0.906   |
| Bottom quartile   |       |        | 0.892   | 0.875   |
| Firm size   |       |        |         |         |
| Top quartile  |       |        | 0.946   | 0.942   |
| Bottom quartile   |       |        | 0.830   | 0.791   |
| R&D   |       |        |         |         |
| Top quartile  |       |        | 0.899   | 0.883   |
| Bottom quartile   |       |        | 0.881   | 0.864   |
| Underpricing  |       |        |         |         |
| Top quartile  |       |        | 0.836   | 0.831   |
| Bottom quartile   |       |        | 0.917   | 0.902   |

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**Table VII**  
**Comparison of Postrepurchase Operating Performance**

This table reports coefficient estimates and model summary statistics for OLS regressions of the pairwise difference in postrepurchase operating performance for each repurchaser-nonrepurchaser matched pair on the corresponding pairwise difference in prerepurchase operating performance. Each surplus cash repurchase observation is matched with a similar nonrepurchasing firm on the basis of industry, cash flow and size (total assets net of cash). The number of matched pairs is 106. To be included in the regression, both the repurchase firm and its matched nonrepurchaser must have operating performance data for both the pre- and postrepurchase periods. Operating performance is measured as either operating cash flow (model 1) or operating profit (model 2), each scaled by total assets net of cash.

| $Operating\ performance_{i,Post} = b_0 + b_1 Operating\ performance_{i,Pre} + e_{i,Post}$ |                  |                  |    |       |                |
|---|------------------|------------------|----|-------|----------------|
|   | $B_0$            | $b_1$            | N  | F     | Adjusted $R^2$ |
| Panel A: $Post = t + 1; Pre = t - 1$  |                  |                  |    |       |                |
| Model 1: Operating cash flow  | 0.033<br>(0.043) | 0.324<br>(0.049) | 79 | 3.98  | 0.037          |
| Model 2: Operating profit   | 0.024<br>(0.046) | 0.415<br>(0.001) | 79 | 15.32 | 0.155          |
| Panel B: $Post = t + 2; Pre = t - 1$  |                  |                  |    |       |                |
| Model 1: Operating cash flow  | 0.026<br>(0.095) | 0.340<br>(0.044) | 63 | 4.22  | 0.049          |
| Model 2: Operating profit   | 0.003<br>(0.809) | 0.808<br>(0.001) | 63 | 34.05 | 0.348          |

**Table VIII**  
**Comparison of Takeover and Failure Probabilities in the Postrepurchase Period**

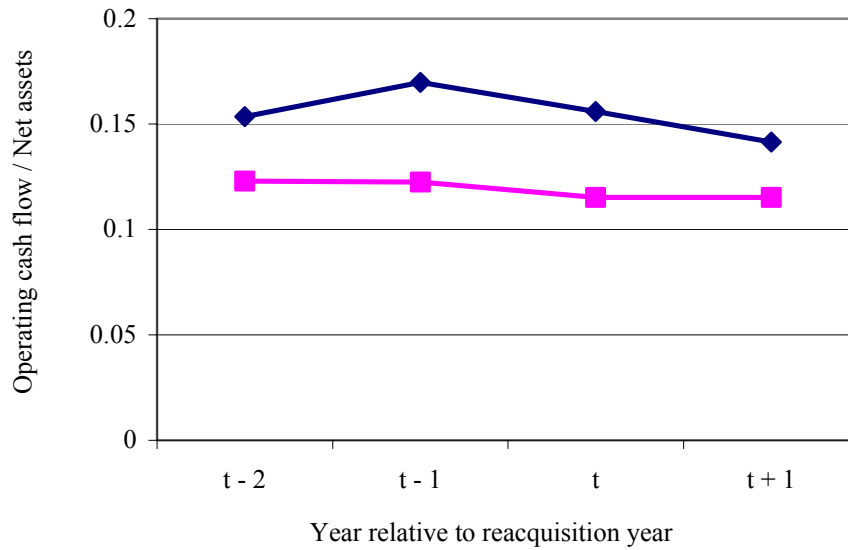
This table reports coefficient estimates and model descriptive statistics for logistic regressions comparing the probability of takeover or outright failure for high cash flow repurchaser and nonrepurchaser firms in the postrepurchase period. Surplus cash repurchasers are matched with a similar nonrepurchasing firm on the basis of industry, cash flow and size. The number of matched pairs is 106. The postrepurchase period comprises the two fiscal years immediately following the event year. The dependent variable in takeover model is 1 if the firm held formal acquisition or merger talks at least once during the postrepurchase period and 0 otherwise. The dependent variable in the failure model is 1 if the firm failed to survive to the end of the postrepurchase period as an independent listed entity and 0 otherwise. Repurchaser is an indicator variable taking the value of 1 for repurchasing firms and 0 for nonrepurchasers. Firm size is the natural logarithm of total assets. Net leverage is total current liabilities plus long-term debt minus cash and cash equivalents divided by total assets minus cash and cash equivalents. Abnormal return is the 12-month market-adjusted share return. Board stock ownership is the ratio of directors' beneficial shareholdings to total shares outstanding. Founder is an indicator variable taking the value of 1 if the founder, co-founder or a descendant of the founder is a board member and 0 otherwise. Fraction of independent outsiders is the ratio of board members with no business or family ties to the firm to total board size. Blockholder is an indicator variable equal to 1 if at least one external stockholder holds  $\geq 10$  percent of the outstanding shares and 0 otherwise. All variables are measured at the beginning of the reacquisition year. Two-tailed probability values are reported in parentheses.

| Variable                                  | Pr(Takeover bid)  | Pr(Failure)       |
|---|-------------------|-------------------|
| Intercept                                 | 1.461<br>(0.287)  | 4.663<br>(0.008)  |
| Repurchaser                               | -0.667<br>(0.060) | -0.998<br>(0.013) |
| Firm size                                 | -0.159<br>(0.095) | -0.384<br>(0.001) |
| Market-to-book                            | 0.085<br>(0.174)  | -0.123<br>(0.302) |
| Net leverage                              | 0.231<br>(0.740)  | 1.520<br>(0.067)  |
| Abnormal returns                          | -0.344<br>(0.385) | -0.579<br>(0.220) |
| Board stock ownership                     | -4.897<br>(0.006) | -3.560<br>(0.028) |
| Founder                                   | -0.020<br>(0.964) | -0.117<br>(0.793) |
| Fraction of independent outside directors | -1.466<br>(0.279) | -1.327<br>(0.365) |
| Blockholder                               | 0.252<br>(0.497)  | -0.178<br>(0.687) |
| $\chi^2$                                  | 17.017            | 25.611            |
| p-value                                   | 0.047             | 0.004             |
| N   | 212               | 212               |

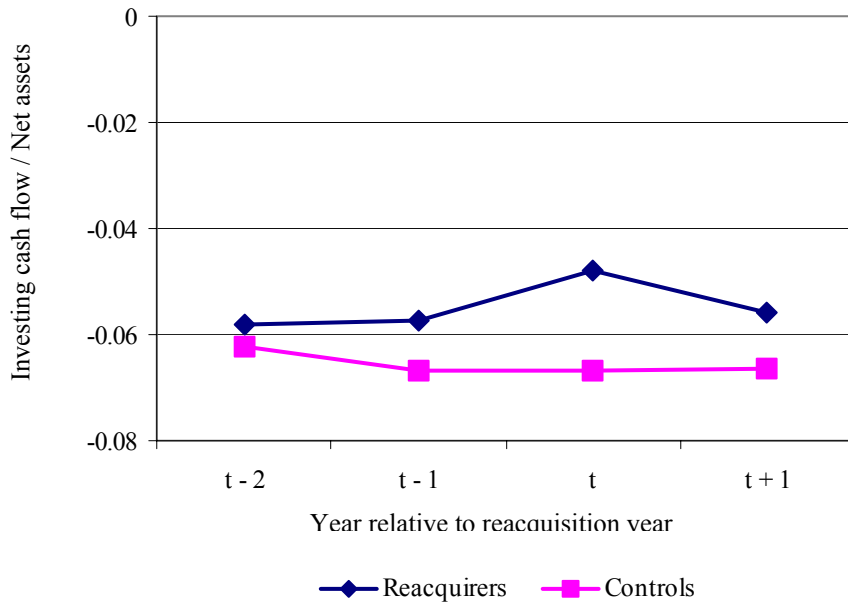
**Figure 1**  
**Time-Series Cash Flow Plots**

These figures present plots of median cash flow from operating and investing activities for repurchasing and nonrepurchasing firms relative to reacquisition year  $t$ . Repurchasers are matched with nonrepurchasing firms on the basis of time, industry and size. The number of matched pairs in year  $t - 1$  is 268. Medians for both the repurchaser and control samples in years other than  $t - 1$  are based on fewer observations due to sample attrition. Both cash flow measures are scaled by total assets net of cash holdings.

Panel A: Median cash flow from operating activities



Panel B: Median cash flow from investing activities



**Figure 2**  
**Time-Series Operating Cash Flow Plots**

These figures present plots of mean cash flow from operations (scaled by total assets net of cash) for surplus cash flow repurchaser and nonrepurchaser firms relative to reacquisition year  $t$ . The surplus cash sample, identified using mandated disclosures in firms published annual reports and accounts, is drawn from the initial set of 429 firm-year repurchase observations from January 1995 through December 2000. Each surplus cash repurchaser is matched with a similar nonrepurchasing firm on the basis of industry, cash flow and size (total assets net of cash). The number of matched pairs in year  $t - 1$  is 106. Means for both the repurchaser and control samples in years other than  $t - 1$  are based on fewer observations because of sample attrition. The solid (—) lines correspond to raw operating cash flows while the dashed (---) lines correspond to industry-adjusted values. Industry adjusted values are defined as operating cash flow for sample firm  $i$  less the corresponding industry-year median value.

